



## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Richard A. Steinke

Examiner: Basia Ridley

Serial No: 09/893,124

Art Unit: 1764

Filed: 06/26/2001

For: APPARATUS FOR THE REMEDIATION OF PARTICULATE MATERIAL AND TOXIC POLLUTANTS IN TRANSIT IN FLUE GAS

**AFFIDAVIT OF RICHARD A. STEINKE**

STATE OF UTAH)

: ss

County of Salt Lake)

COMES NOW the affiant, Richard A Steinke, inventor of the invention described and claimed in the subject U.S. Patent Application who affirms and swears as follows:

1. I am the sole inventor of the subject invention that was first embodied in a U.S. Patent Application Serial No. 09/323,215, that was filed on June 1, 1999, that the present application is a Continuation in Part application from.
2. From June 20, 1991 to November 1, 1994 I was the CEO of Alanco Environmental Resources Corporation, of Salt Lake City, Utah and Scottsdale, Arizona, and was directly involved as a both an inventor and supervisor in the development of systems for the removal of particulate matter and gases from a polluted gas stream, and was co-inventor of: U.S. Patent No. 5,332,562, issued, July 26, 1994, for a "Method for Removing Particulate Matter and Gases From a Polluted Gas Stream"; U.S. Patent No. 5,312,598, issued May 17, 1994, for a "Hopper System and Electrostatic Gun for Injection of an Electrostatically Charged Sorbent into a Polluted Gas Stream";

and U.S. Patent No. 5,591,412, issued January 7, 1997, for an "Electrostatic Gun for Injection of an Electrostatically Charged Sorbent into a Polluted Gas Stream".

3. On or about July 8, 1995 I organized and became President and CEO of American Environmental Corporation located in Boulder City, Nevada, looking to developing and employing improvements in methods and apparatus for the removal of particulate matter and toxic pollutants from flue gas that would improve upon earlier technology, including my earlier U.S. Patents.

4. From my earlier acquired knowledge I realized that more than a mixing of sorbent materials in a flue gas stream to provide adherence of the flue gas particulate matter, with or without electrostatic charging of the sorbent material particles, was needed to obtain adherence of the sorbent material and flue gas noxious particles so as to insure a high percentage of particulate removal in a bag house or other appropriate particulate removal apparatus.

5. From my experience I believed that a combination of a thorough mixing of sorbent material particles with the flue gas pollutants and, with a certain moisture content of the conglomerated sorbent material particles and pollutant particles, the conglomerate would be held together, allowing for its capture on a bag surface as is used in a bag house.

6. To provide a thorough mixing, it was determined to inject the sorbent particles counter current into the flue gas flow and, after the mixture had traveled a sufficient distance to provide a complete dissemination of the sorbent particles throughout the moving flue gas, moisture, as needed, is introduced in the form of a spray into the flow to activate the sorbent particles, providing binding of the sorbent particles to the pollutant particulates.

7. In practice, it was found that the moisture content of the mixture was critical to just achieve an activation of the sorbent particles and their binding with the pollutant particulates, and



that excess moisture causes the combined particles of sorbent and flue gas particulates to stick to the bags surfaces, clogging the bag house system, and whereas, in practice, it was found that if the moisture content of the particles was below a certain desired content, the sorbent particles did not activate and a conglomeration of the sorbent particles and flue gas particulates did not occur.

8. Recognizing that the moisture content needed to be closely controlled, different moisture contents of the conglomerate were tried and it was determined that an optimum moisture content was approximately at eighteen percent of saturation and up to twenty percent of saturation.

9. I realized that, while the flue gas would have some moisture content, and that the flue gas moisture will vary dependant upon what was generating the flue gas, the atmospheric conditions, and other variables, and that, to achieve an optimum pollutant removal, the moisture content must be determined after the counter current introduction and mixing of the sorbent materials into the flue gas flow, and from that measurement, water, preferably in the form of a fine mist, needed to be added to provide the optimum moisture content of from eighteen to twenty percent of saturation.

10. Accordingly, to provide such moisture monitoring, a sensor was located downstream in the flue gas flow from where the sorbent material was introduced, and before a water mist is introduced, which sensor provides a continued determination of moisture content, and passes information to a control devise that, in turn commands operation of a water flow valve, controlling passage of a measured flow of water that is injected as a mist into the combined flue gas and sorbent material mixture as it passes into a pollutant particulate removal device.

11. Prior to the invention, pollutant removal rates of pollution particles from flue gas flows were deemed, by the industry, to be successful if that removal rate was from 70 to 90 percent of the

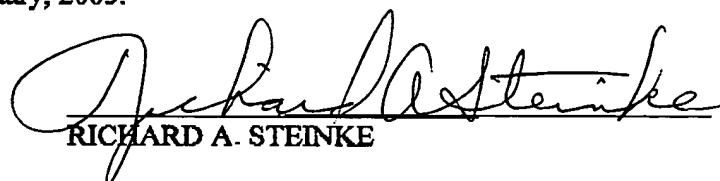


pollution particles, and even utilizing an electrostatic particle charging this industry standard could not be improved upon.

12. Whereas in an operation of the invention, where the pollutant particular removal device is a bag house, a removal of pollutants from a flue gas flow achieves a ninety seven percent and better removal rate of flue gas particles, achieving a very unexpected result.

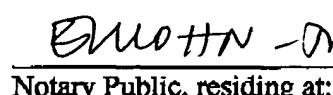
The undersigned, being hereby warned that willful false statements and te like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001, and that such willful false statements may jeopardize the validity of the application or any resulting registration, declares that the facts set forth in this application are true; all statements made of his own knowledge are true; and all statements made on information and belief are believed to be true.

DATED this 24<sup>th</sup> day of January, 2005.



RICHARD A. STEINKE

SUBSCRIBED AND SWORN to before me this 24<sup>th</sup> day of JANUARY,  
2005.



Notary Public, residing at:

My Commission Expires:

OR#7455-CIPSoco-Aff

